REMARKS/ARGUMENTS

Claims 1-28 were pending in the present application. The present response amends claims 1, 3, 27, and 28; and cancels claims 13-26; leaving pending in the application claims 1-12 and 27-28. Reconsideration of the rejected claims is respectfully requested.

I. Restriction Requirement

In conjunction with the telephone conversation of March 16, 2004 with Michael Stallman, Applicants elect without traverse to prosecute the invention of Group I, claims 1-12 and 27-28. Claims 13-26 are therefore withdrawn from the present application.

II. Objection to the Drawings

The drawings are objected to as failing to include reference signs mentioned in the description. Particularly, the Figures fail to show reference signs 31a, 31b, and 29b as recited in the specification. A replacement sheet has been submitted for Figure 2, in which the inadvertent typographical errors showing 31a and 31b both as element 31, have been corrected. Further, a replacement for paragraph [0025] has been submitted to correct the recitation of central fiber 29b to 31b, as would be obvious in light of the specification and the drawings. These changes to the Figure and specification are not intended to alter the scope of the invention or be interpreted as a limitation on the claimed invention. Applicants respectfully request that the objection to the drawings be withdrawn.

III. Objection to the Claims

Claim 28 is objected to due to a simple informality of a typographical error, in which claim 28 depends from itself. Claim 28 has been amended to properly depend from claim 27, which would be obvious in light of the preamble of claim 28 and the specification as filed, and does not add new matter to the specification. As such, Applicants respectfully request that the objection to claim 28 be withdrawn.

IV. Rejection under 35 U.S.C. §103

Claims 1-6, 8-12, and 27 are rejected under 35 U.S.C. §103(a) as being obvious over *Fidric* (US 6,434,302) in view of *Stamnitz* (US 4,913,507).

Claim 1 requires a tapered optical fiber bundle defined by:

> a plurality of input fibers formed into a fiber bundle, the fiber bundle being adiabatically tapered, and heavily-fused into an induced cross-sectional shape with minimally deformed cores and no interstitial space between the input fibers, **wherein prior to fusing the input fibers in the bundle are arranged such that the cross-sectional shape has an encircling radius smaller than can be obtained with hexagonal packing.**

(*emphasis added*). Such limitations are not rendered obvious by *Fidric* and *Stamnitz*.

Fidric teaches an optical coupler comprising a "plurality of combined multimode fibers bundled and fused together" having a "decreasing taper down to a minimum diametrical waist" that is "sufficiently small so that the input light from the combined multimode fibers substantially fills the entire numerical aperture (NA) of the output fiber" (col. 2, lines 46-66). *Fidric* does not teach or suggest a cross-sectional shape with an encircling radius smaller than can be obtained with hexagonal packing prior to fusing, but instead teaches "equal laterally [sic]" bundling the multimode fibers about a single mode fiber (col. 3, lines 11-31; col. 3, lines 46-58; col. 5, lines 21-30; Figs. 4a and 6b). Further, the bundled fibers "are fused together at a high temperature that will melt the glass fibers" (col. 5, lines 21-30). It is not clear whether any steps are taken to ensure that the cores are minimally deformed as required by claim 1. As discussed with respect to Figures 4a and 4b in the present application, such a configuration will not always produce a minimized encircling radius. *Fidric* also does not teach or suggest adiabatic tapering. As *Fidric* fails to teach or suggest these limitations, *Fidric* cannot render claim 1 obvious.

Stamnitz does not make up for the deficiencies in *Fidric* with respect to claim 1. *Stamnitz* is cited as teaching the adiabatic tapering of a single optical fiber to retain single-mode operation in fiber-to-fiber coupling (col. 2, lines 51-66; OA p. 5). *Stamnitz* does not teach or suggest that a bundle of fibers can be adiabatically tapered with any likelihood of success. Further, *Stamnitz* does not teach or suggest a bundle arranged to have a cross-sectional shape with an encircling radius smaller than can be obtained with hexagonal packing. As such, *Stamnitz* cannot render claim 1 obvious, either alone or in combination with *Fidric*. Claim 2 depends from claim 1 and also should not be rendered obvious.

Claim 3 requires an optical fiber device defined by:

> a tapered fiber **bundle** having a plurality of input fibers, **adiabatically tapered**, and **heavily-fused** into an induced compact shape with **minimally deformed cores** and no interstitial space between the input fibers at a cleaved end, wherein prior to fusing **the input fibers in the bundle are arranged such that the cross-sectional shape has an encircling radius smaller than can be obtained with hexagonal packing**; and
> an output element coupled to the cleaved end.

(*emphasis added*). As discussed above, limitations such as an adiabatically tapered bundle and a cross-sectional bundle shape having an encircling radius smaller than can be obtained with hexagonal packing are not rendered obvious by *Fidric* and *Stamnitz*, either alone or in combination. Therefore, claim 3 and dependent claims 4-6 and 8-12 cannot be rendered obvious by *Fidric* and *Stamnitz*.

Claim 27 requires a star coupler defined by:

> a tapered fiber bundle formed in the midsection of a plurality of fibers, **adiabatically tapered**, and **heavily-fused** into an induced compact shape with **minimally deformed cores** and no interstitial space between the fibers, **wherein prior to fusing the fibers in the bundle are arranged such that the cross-sectional shape has an encircling radius smaller than can be obtained with hexagonal packing**, such that the plurality of fibers form input and output leads on each side of the fused bundle

(*emphasis added*). As discussed above, limitations such as an adiabatically tapered bundle and arranging fibers prior to fusing such that the cross-sectional shape has an encircling radius smaller than can be obtained with hexagonal packing are not rendered obvious by *Fidric* and *Stamnitz*, either alone or in combination. Therefore, claim 27 cannot be rendered obvious by *Fidric* and *Stamnitz*.

Claims 7 and 28 are rejected under 35 U.S.C. §103(a) as being obvious over *Fidric* (US 6,434,302) in view of *Stamnitz* (US 4,913,507), and further in view of *Weidman* (US 5,644,037). Claims 7 and 28 depend from claims 3 and 27, respectively, which are not rendered obvious by *Fidric* and *Stamnitz* for reasons including those discussed above. *Weidman* does not make up for the deficiencies in *Fidric* and *Stamnitz* with respect to claims 2 and 27. *Weidman* is cited as teaching terminating input fibers in order to reduce back reflections (OA p. 6; col. 4, lines 52-67). *Weidman* does not, however, teach or suggest an adiabatically tapered bundle, or the fibers in the bundle being arranged prior to fusing such that the cross-sectional shape has an encircling radius smaller than can be obtained with hexagonal packing. As such, *Weidman* cannot make up for the deficiencies in *Fidric* and *Stamnitz* with respect to claims 3 and 27. Claims 7 and 28 depend from claims 3 and 27, and therefore cannot be rendered obvious by *Weidman*, *Fidric*, and *Stamnitz*, either alone or in any combination.

Applicants therefore respectfully request that the rejection with respect to claims 1-12 and 27-28 be withdrawn.

V. Amendment to the Claims

Unless otherwise specified, amendments to the claims are made for purposes of clarity, and are not intended to alter the scope of the claims or limit any equivalents thereof. The amendments are supported by the specification and do not add new matter to the specification.

VI. Conclusion

In view of the above, it is respectfully submitted that the application is now in condition for allowance. Reconsideration of the pending claims and a notice of allowance is respectfully requested.

The Commissioner is hereby authorized to charge any deficiency in the fees filed, asserted to be filed, or which should have been filed herewith (or with any paper hereafter filed in this application by this firm) to our Deposit Account No. 50-1703, under Order No. COHL-4940. **A duplicate copy of the transmittal cover sheet attached to this Response to Office Action Mailed March 29, 2004, is provided herewith.**

Respectfully submitted,

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